

Date: Mon, 9 Aug 93 04:30:16 PDT
From: Ham-Ant Mailing List and Newsgroup <ham-ant@ucsd.edu>
Errors-To: Ham-Ant-Errors@UCSD.Edu
Reply-To: Ham-Ant@UCSD.Edu
Precedence: Bulk
Subject: Ham-Ant Digest V93 #7
To: Ham-Ant

Ham-Ant Digest Mon, 9 Aug 93 Volume 93 : Issue 7

Today's Topics:

Send Replies or notes for publication to: <Ham-Ant@UCSD.Edu>
Send subscription requests to: <Ham-Ant-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Ant Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-ant".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: 9 Aug 1993 08:28:43 GMT
From: dog.ee.lbl.gov!overload.lbl.gov!agate!uclink.berkeley.edu!
michaeld@network.ucsd.edu
To: ham-ant@ucsd.edu

References <1993Aug6.143914.23928@ke4zv.uucp>, <23vvbm\$pir@agate.berkeley.edu>,
<1993Aug8.162600.3216@ke4zv.uucp>
Subject : Re: Some Fundamental Antenna Questions

In article <1993Aug8.162600.3216@ke4zv.uucp>,
Gary Coffman <gary@ke4zv.UUCP> wrote:
>In article <23vvbm\$pir@agate.berkeley.edu> michaeld@uclink.berkeley.edu ((Mikey
Likes It) S. Dahl) writes:
>>...and how many angels can dance on the end of a pin?
>>
>>Would analogizing all this discussion on antenna aperture to
>>lenses be inappropriate?
>>
>Comparing antennas and lenses, mirrors, is appropriate in cases
>where the antenna is much larger than a wavelength. For example,
>a dish can be treated the same way as an optical mirror. But when
>elements become of the same size, or smaller, than the wavelength,
>the correspondence breaks down. This is precisely the area where

>we are in dispute.
(some of Gary's response deleted for the sake of bandwidth)
>There's a
>physical mechanism at work that no one has put their finger on
>as yet. I mentioned one mechanism early on when I said that ferrite
>loading of a small loop alters the properties of space in the
^^
>vicinity of the antenna, concentrating the flux lines through the
^^
>coil. Now, is this the mechanism by which air core coils and straight
>wires also work? I don't think so, at least not the same way.
>
>Gary

I like that part about altering the properties of space (8-).
We need to get Larry Niven, Jerry Pournelle, and Dean Ng in
on this discussion...maybe Stephen Hawking while we're at it!
Maybe the interstellar ramscoop ships of Larry Niven's S-F books
should've employed ferrite-loaded small loops!
We may be on to the secret of bending the fabric of space (;-).

Seriously tho, a ferrite-loaded loop must have a field around it,
set-up by the ambient E-M flux in the loop, and this field extends
beyond the physical dimensions of the loop. This field would perhaps
bend (gather) E-M waves inward toward it? Maybe some form of refraction
is playing a part?
...Just wild speculation here.
Keep at it guys, it makes interesting reading, even if I didn't
finish physics or calculus.

And thanks Gary for the reply.
--
Michael Dahl/KC6UFR

Date: 9 Aug 1993 08:49:56 GMT
From: dog.ee.lbl.gov!overload.lbl.gov!agate!uclink.berkeley.edu!
michaeld@network.ucsd.edu
To: ham-ant@ucsd.edu

References <1993Aug6.143914.23928@ke4zv.uucp>, <23vvbm\$pir@agate.berkeley.edu>,
<243q6p\$okb@chnews.intel.com>
Subject : Re: Some Fundamental Antenna Questions

In article <243q6p\$okb@chnews.intel.com>,
James Bromley, W5GYJ <jbromley@sedona.intel.com> wrote:
>

>michaeld@uclink.berkeley.edu ((Mikey Likes It) S. Dahl) posts:
>
>> Would analogizing all this discussion on antenna aperture to
>> lenses be inappropriate?
>
>Not for small stuff. A better optical quantity might be scattering
>cross section. There you have things like diatomic oxygen molecules
>interacting with blue light possessing a wavelength orders of magnitude
>larger than the molecular diameter. Or 1-millimeter raindrops reflecting
>1300-MHz (20 cm) radar waves. Same deal with antennas except you suck

As I recall, there are 2 or 3 different scattering mechanisms, Rayleigh,
and ? (one is referred to as the Tyndall effect--the blue scattering).
You're talking quantum effects there, since the photon energy happens to be
equal to one of the discrete energy level steps in the oxygen molecule.
Interesting analogy. (this is where wavelength doesn't explain the interaction
as well as particle--photon--energy? Ditto the radar scenario?).
Does a single water drop reflect a 20cm wave, or is an aggregate of droplets
needed? (therefore acting as a screen/mesh-like reflector?). A microwave oven
rotates water molecules, and they're damn smaller than the wave.
I also recall something in physics like this:

Wavefront))))) Barrier w/holes smaller than wave)))) Waves showing-up on
opposite side

...this could only be explained by thinking of the E-M radiation as waves,
then particles, then waves again...

We've sure gone a ways from antennas, eh?

--

Michael/KC6UFR

>off some of the energy.

>

```
>+-----+-----+
>| Jim Bromley W5GYJ | |
>| Intel Corp. m/s CH3-91 | This message transmitted with |
>| 5000 W. Chandler Blvd. | 100% recycled electrons. |
>| Chandler,AZ 85226 | |
>| tel: 602-554-5183 | Internet: jlbromley@sedona.intel.com |
>+-----+-----+
```

Date: 9 Aug 1993 09:34:01 GMT

From: dog.ee.lbl.gov!overload.lbl.gov!agate!uclink.berkeley.edu!

michaeld@network.ucsd.edu

To: ham-ant@ucsd.edu

References <1993Aug6.143914.23928@ke4zv.uucp>, <23vvbm\$pir@agate.berkeley.edu>, <243t35\$qb9@chnews.intel.com>

Subject : Re: Some Fundamental Antenna Questions

In article <243t35\$qb9@chnews.intel.com>, James Bromley~ <jbromley@sedona.intel.com> wrote:

>

>

>michaeld@uclink.berkeley.edu ((Mikey Likes It) S. Dahl) also posts:

>

>> Synthetic aperture radar works because of the movement of
>> the platform the antenna is on and the non-instantaneous travel-time
>> of the radar wave...the effective size of the antenna becomes the distance
>> the platform has traveled from the time a wave left and the time it
>> comes back.

>

>Uh...no, it doesn't. It works because the target moves with respect
>to the radar while it is being illuminated (possibly for hours) and
>induces a doppler shift in the returned signal. The returned signal's

You mean everything I learned in two quarters of a college remote-sensing class were wrong! That Panamanian jungle I saw images of from a moving plane must've been moving too? Go back to your Einstein, all motion is relative, it doesn't matter which is moving, the target or the antenna...but there must be relative movement for the gizmo to work (actually the movement is an artifact of the need for multiple points of observation). I did say phased-array constituted a "non-moving" antenna (well not completely true). >planet Venus).

>

>The synthetic aperture part comes in when the compressed signal's
>resolution is compared to that of the hypothetical "real" radar
>antenna necessary to achieve comparable results. Well, the analogy

Well, I'll have to go dig-up a textbook or two to argue with you on the origins of the term "synthetic aperture," but aperture means opening, and synthetic means, well, synthetic (contrived, "with thought"). Whether the antenna is moving relative to the target (a cloud-shrouded jungle, or a sunken ship (side-scanning sonar)), or the target is moving relative to the antenna (a planet or moon in it's orbit and rotation), the net effect is that of a baseline/antenna (read: aperture) much larger than that being used (thus synthesised).

And you don't need "digital" anywhere in the definition. I don't know if a VLBA setup qualifies as a synthetic aperture, but if so, then one using optical telescopes, with the photographic plates then viewed with a stereo comparator is analog. (and then, so would a binocular, with it's greater-than-normal interocular distance to increase the 3-D perception by the brain. Come to think of it,

the setup for taking a hologram--with a beam-splitter and combined target information from more than one point being combined as interference patterns on the photo plate (yes, phase differences), must qualify too.

>| Jim Bromley W5GYJ |

...No need for the 10 min. course Jim, but thanks anyway.

--

Michael/KC6UFR

End of Ham-Ant Digest V93 #7
